

AMENDMENTS TO THE CLAIMS

1. (Currently Amended) A Process ~~process for the~~ for the production of precipitated silica from olivine,

~~characterised by comprising~~ the following steps:

- providing olivine particles with a particle size ~~preferably~~ below 1 mm in diameter,
- ~~preferably~~ mixing the olivine particles and water to form an olivine/water slurry,
- mixing the olivine/water slurry with hydrochloric acid (HCl), ~~preferably~~ at a concentration at 18 wt% or above, and at a temperature ~~preferably~~ between 50 – 130°C, to form an olivine/acid slurry, and reacting the olivine/acid slurry for a period of time, ~~preferably~~ between 20 – 360 minutes to form a reacted mixture, wherein the reacted mixture contains coarse mineral impurities,
- ~~removal of~~ removing the coarse mineral impurities (sand product) from the reacted mixture to obtain a mother solution comprising precipitated silica,
- ~~separation of~~ separating the precipitated silica from the mother solution,
- ~~mechanical treatment~~ mechanically treating of the separated precipitated silica and optionally some water to obtain a slurry,
- ~~preparation of~~ preparing a low viscosity slurry by adding sodium aluminate or another suitable aluminate, ~~preferably~~ to 100 – 6000 p.p.m., and adjusting the pH, ~~preferably to values to a value~~ between 4 – 9,
- ageing the low viscosity slurry at a temperature between 50 – 150°C according to product requirements,
- ~~dispersion of~~ dispersing the aged silica slurry, wherein the slurry contains fine mineral impurities,
- ~~removal of~~ removing the fine mineral impurities (sand product) from the slurry to obtain a substantially purified slurry, and
- drying of the silica.

2. (Currently Amended) The Process process according to claim 1, ~~characterised in that wherein~~ the mechanical treatment of the separated precipitated silica, optional with water addition, the preparation of ~~a~~ the low viscosity slurry by adding sodium aluminate or another suitable aluminate, preferably to 100 – 6000 p.p.m., and the pH adjustment, preferably to a value values between 4 – 9 is 4 – 9, are carried out in one step.

3. (Currently Amended) The Process process according to claim 1, ~~characterised in that wherein~~ the particle size of the olivine is in the range of between 0.020 and 0.350 mm in diameter.

4. (Currently Amended) The Process process according to claim 1, ~~characterised in that wherein~~ the temperature of the acid solution, when the adding of the acid mixing with the olivine/water slurry is started, preferably is in the range of about 90-115°C.

5. (Currently Amended) The Process process according to claim 1, ~~characterised in that wherein~~ the temperature of the olivine/acid slurry immediately after mixing olivine and acid is in the range of 90-110°C.

6. (Currently Amended) The Process process according to claim 1, ~~characterised in that wherein~~ the time for mixing the olivine/water slurry and the acid is between 0,5-0,5 and 5 minutes.

7. (Currently Amended) The Process process according to claim 1, ~~characterised in that wherein~~ the hydrochloric acid (HCl) concentration is 18% at the start of the mixing with the olivine/water slurry, and additional concentrated HCl is added during the reaction time until sufficient amount is obtained.

8. (Currently Amended) The Process process according to claim 1, ~~characterised in that wherein~~ the total reaction time is preferably in the range of 60 - 150 minutes.

9. (Currently Amended) Process The process according to claim 1,
~~characterised in that~~ wherein the removal of the coarse particles mineral impurities is
accomplished by allowing the slurry to sediment in a sedimentation vessel.

10. (Currently Amended) Process The process according to claim 1,
~~characterised in that~~ wherein the removal of the coarse particles is ~~alternatively~~ accomplished by
means of hydrocyclone(s).

11. (Currently Amended) Process The process according to claim 1,
~~characterised in that~~ wherein the precipitated silica obtained after separation by filtration is
separated from the mother solution is by filtration to form a filter cake, then washed with an
aqueous washing liquid (typically water) until suitably pure.

12. (Currently Amended) Process The process according to claim 11,
~~characterised in that~~ wherein the content of solid material in the filter cake after filtration is in
the range of about 10-30%, or preferably in the range of 18-22%.

13. (Currently Amended) Process The process according to claim 1,
~~characterised in that~~ wherein the resulting purified precipitated silica is subsequently and
preferably mechanically treated with a kneading device, in e.g. a kneading device, to obtain a
slurry with a high content of solid material.

14. (Currently Amended) Process The process according to claim 1,
~~characterised in that~~ wherein in the preparation of a the low viscosity slurry is obtained by
addition of adding sodium aluminate, or other another suitable aluminatesaluminate, to a
concentration preferably in the range of 300 – 3500 p.p.m. 300 to 3500 ppm., and
wherein that sulfuric acid, and hydrochloric acid or another suitable acids acid is added
for pH adjustment, to obtain obtaining a pH preferably in the range of 5 – 8.

15. (Currently Amended) Process The process according to claim 14,
~~characterised in that wherein~~ the content of solid material in the low viscosity slurry is in the range of about 10-25%, ~~or preferably in the range of 18-24%~~.

16. (Currently Amended) Process The process according to claim 1,
~~characterised in that wherein~~ the CTAB/BET ratio is increased to above 0.9 by ageing the silica low viscosity slurry, in a stirred tank, preferably at a temperature of between 80 – 100 °C.

17. (Currently Amended) Process The process according to claim 1,
~~characterised in that wherein the pH of the low viscosity slurry is adjusted using NaOH or acid,~~
and wherein the alumina content ~~may be~~ is further increased after ageing by addition of sodium aluminate, or another suitable aluminate, and acid in an additional treatment step (9), ~~and that this alternative route might require NaOH instead of acid in order to obtain the required pH (step 7 of claim 1).~~

18. (Currently Amended) Process The process according to claim 1,
~~characterised in that wherein~~ the pH of the substantially purified slurry is adjusted to a desired pH value, ~~value~~ in the range of 6,5 to 7,0, ~~6.5 to 7.0~~, prior to drying.

19. (Currently Amended-Withdrawn) A Silica silica product manufactured according to the process for the production of precipitated silica from olivine according to claim 1,
wherein the silica product comprises ~~characterised by the following composition~~, in addition to silica (SiO₂); 0,005 0,005 – 0,70,7 wt% Na, 0,0035 0,0035 – 0,35 0,35 wt% Al, 0,02 0,02 – 0,05 0,05 wt% Mg, 0,002 0,002 – 0,006 0,006 wt% Ca, 0,001 0,001 – 0,2 0,2 wt% S, 0,007 0,007 – 0,06 0,06 wt% Fe, up to 0,01 0,01 wt% Cl, and 1 – 10 wt% H₂O, and
wherein the silica product has and with a pH between 4 – 9.

20-26. (Cancelled)

27. (New) The process according to claim 11, wherein the aqueous washing liquid is water.

28. (New) The process according to claim 12, wherein content of the solid material in the filter cake after filtration is in the range of 18-22%.

29. (New) The process according to claim 15, wherein the content of solid material in the low viscosity slurry is in the range of 18-24%.

30. (New-Withdrawn) A silica product manufactured according to the process for the production of precipitated silica from olivine according to claim 2,
wherein the silica product comprises, in addition to silica (SiO₂); 0.005 – 0.7 wt% Na, 0.0035 – 0.35wt% Al, 0.02– 0.05wt% Mg, 0.002– 0.006wt% Ca, 0.001– 0.2wt% S, 0.007– 0.06wt% Fe, up to 0.01wt% Cl, and 1 – 10 wt% H₂O, and
wherein the silica product has a pH between 4 – 9.

31. (New-Withdrawn) A silica product manufactured according to the process for the production of precipitated silica from olivine according to claim 3,
wherein the silica product comprises, in addition to silica (SiO₂); 0.005 – 0.7 wt% Na, 0.0035 – 0.35wt% Al, 0.02– 0.05wt% Mg, 0.002– 0.006wt% Ca, 0.001– 0.2wt% S, 0.007– 0.06wt% Fe, up to 0.01wt% Cl, and 1 – 10 wt% H₂O, and
wherein the silica product has a pH between 4 – 9.

32. (New-Withdrawn) A silica product manufactured according to the process for the production of precipitated silica from olivine according to claim 4,
wherein the silica product comprises, in addition to silica (SiO₂); 0.005 – 0.7 wt% Na, 0.0035 – 0.35wt% Al, 0.02– 0.05wt% Mg, 0.002– 0.006wt% Ca, 0.001– 0.2wt% S, 0.007– 0.06wt% Fe, up to 0.01wt% Cl, and 1 – 10 wt% H₂O, and
wherein the silica product has a pH between 4 – 9.

33. (New-Withdrown) A silica product manufactured according to the process for the production of precipitated silica from olivine according to claim 5,

wherein the silica product comprises, in addition to silica (SiO₂); 0.005 – 0.7 wt% Na, 0.0035 – 0.35wt% Al, 0.02 – 0.05wt% Mg, 0.002 – 0.006wt% Ca, 0.001 – 0.2wt% S, 0.007 – 0.06wt% Fe, up to 0.01wt% Cl, and 1 – 10 wt% H₂O, and

wherein the silica product has a pH between 4 – 9.

34. (New-Withdrown) A silica product manufactured according to the process for the production of precipitated silica from olivine according to claim 6,

wherein the silica product comprises, in addition to silica (SiO₂); 0.005 – 0.7 wt% Na, 0.0035 – 0.35wt% Al, 0.02 – 0.05wt% Mg, 0.002 – 0.006wt% Ca, 0.001 – 0.2wt% S, 0.007 – 0.06wt% Fe, up to 0.01wt% Cl, and 1 – 10 wt% H₂O, and

wherein the silica product has a pH between 4 – 9.

35. (New-Withdrown) A silica product manufactured according to the process for the production of precipitated silica from olivine according to claim 7,

wherein the silica product comprises, in addition to silica (SiO₂); 0.005 – 0.7 wt% Na, 0.0035 – 0.35wt% Al, 0.02 – 0.05wt% Mg, 0.002 – 0.006wt% Ca, 0.001 – 0.2wt% S, 0.007 – 0.06wt% Fe, up to 0.01wt% Cl, and 1 – 10 wt% H₂O, and

wherein the silica product has a pH between 4 – 9.

36. (New-Withdrown) A silica product manufactured according to the process for the production of precipitated silica from olivine according to claim 8,

wherein the silica product comprises, in addition to silica (SiO₂); 0.005 – 0.7 wt% Na, 0.0035 – 0.35wt% Al, 0.02 – 0.05wt% Mg, 0.002 – 0.006wt% Ca, 0.001 – 0.2wt% S, 0.007 – 0.06wt% Fe, up to 0.01wt% Cl, and 1 – 10 wt% H₂O, and

wherein the silica product has a pH between 4 – 9.

37. (New-Withdrawn) A silica product manufactured according to the process for the production of precipitated silica from olivine according to claim 9,

wherein the silica product comprises, in addition to silica (SiO₂); 0.005 – 0.7 wt% Na, 0.0035 – 0.35wt% Al, 0.02 – 0.05wt% Mg, 0.002 – 0.006wt% Ca, 0.001 – 0.2wt% S, 0.007 – 0.06wt% Fe, up to 0.01wt% Cl, and 1 – 10 wt% H₂O, and

wherein the silica product has a pH between 4 – 9.

38. (New-Withdrawn) A silica product manufactured according to the process for the production of precipitated silica from olivine according to claim 10,

wherein the silica product comprises, in addition to silica (SiO₂); 0.005 – 0.7 wt% Na, 0.0035 – 0.35wt% Al, 0.02 – 0.05wt% Mg, 0.002 – 0.006wt% Ca, 0.001 – 0.2wt% S, 0.007 – 0.06wt% Fe, up to 0.01wt% Cl, and 1 – 10 wt% H₂O, and

wherein the silica product has a pH between 4 – 9.

39. (New-Withdrawn) A silica product manufactured according to the process for the production of precipitated silica from olivine according to claim 11,

wherein the silica product comprises, in addition to silica (SiO₂); 0.005 – 0.7 wt% Na, 0.0035 – 0.35wt% Al, 0.02 – 0.05wt% Mg, 0.002 – 0.006wt% Ca, 0.001 – 0.2wt% S, 0.007 – 0.06wt% Fe, up to 0.01wt% Cl, and 1 – 10 wt% H₂O, and

wherein the silica product has a pH between 4 – 9.

40. (New-Withdrawn) A silica product manufactured according to the process for the production of precipitated silica from olivine according to claim 12,

wherein the silica product comprises, in addition to silica (SiO₂); 0.005 – 0.7 wt% Na, 0.0035 – 0.35wt% Al, 0.02 – 0.05wt% Mg, 0.002 – 0.006wt% Ca, 0.001 – 0.2wt% S, 0.007 – 0.06wt% Fe, up to 0.01wt% Cl, and 1 – 10 wt% H₂O, and

wherein the silica product has a pH between 4 – 9.

41. (New-Withdrawn) A silica product manufactured according to the process for the production of precipitated silica from olivine according to claim 13,

wherein the silica product comprises, in addition to silica (SiO₂); 0.005 – 0.7 wt% Na, 0.0035 – 0.35wt% Al, 0.02 – 0.05wt% Mg, 0.002 – 0.006wt% Ca, 0.001 – 0.2wt% S, 0.007 – 0.06wt% Fe, up to 0.01wt% Cl, and 1 – 10 wt% H₂O, and

wherein the silica product has a pH between 4 – 9.

42. (New-Withdrawn) A silica product manufactured according to the process for the production of precipitated silica from olivine according to claim 14,

wherein the silica product comprises, in addition to silica (SiO₂); 0.005 – 0.7 wt% Na, 0.0035 – 0.35wt% Al, 0.02 – 0.05wt% Mg, 0.002 – 0.006wt% Ca, 0.001 – 0.2wt% S, 0.007 – 0.06wt% Fe, up to 0.01wt% Cl, and 1 – 10 wt% H₂O, and

wherein the silica product has a pH between 4 – 9.

43. (New-Withdrawn) A silica product manufactured according to the process for the production of precipitated silica from olivine according to claim 15,

wherein the silica product comprises, in addition to silica (SiO₂); 0.005 – 0.7 wt% Na, 0.0035 – 0.35wt% Al, 0.02 – 0.05wt% Mg, 0.002 – 0.006wt% Ca, 0.001 – 0.2wt% S, 0.007 – 0.06wt% Fe, up to 0.01wt% Cl, and 1 – 10 wt% H₂O, and

wherein the silica product has a pH between 4 – 9.

44. (New-Withdrawn) A silica product manufactured according to the process for the production of precipitated silica from olivine according to claim 16,

wherein the silica product comprises, in addition to silica (SiO₂); 0.005 – 0.7 wt% Na, 0.0035 – 0.35wt% Al, 0.02 – 0.05wt% Mg, 0.002 – 0.006wt% Ca, 0.001 – 0.2wt% S, 0.007 – 0.06wt% Fe, up to 0.01wt% Cl, and 1 – 10 wt% H₂O, and

wherein the silica product has a pH between 4 – 9.

45. (New-Withdrown) A silica product manufactured according to the process for the production of precipitated silica from olivine according to claim 17,

wherein the silica product comprises, in addition to silica (SiO₂); 0.005 – 0.7 wt% Na, 0.0035 – 0.35wt% Al, 0.02 – 0.05wt% Mg, 0.002 – 0.006wt% Ca, 0.001 – 0.2wt% S, 0.007 – 0.06wt% Fe, up to 0.01wt% Cl, and 1 – 10 wt% H₂O, and

wherein the silica product has a pH between 4 – 9.

46. (New-Withdrown) A silica product manufactured according to the process for the production of precipitated silica from olivine according to claim 18,

wherein the silica product comprises, in addition to silica (SiO₂); 0.005 – 0.7 wt% Na, 0.0035 – 0.35wt% Al, 0.02 – 0.05wt% Mg, 0.002 – 0.006wt% Ca, 0.001 – 0.2wt% S, 0.007 – 0.06wt% Fe, up to 0.01wt% Cl, and 1 – 10 wt% H₂O, and

wherein the silica product has a pH between 4 – 9.

47. (New-Withdrown) A silica product manufactured according to the process for the production of precipitated silica from olivine according to claim 27,

wherein the silica product comprises, in addition to silica (SiO₂); 0.005 – 0.7 wt% Na, 0.0035 – 0.35wt% Al, 0.02 – 0.05wt% Mg, 0.002 – 0.006wt% Ca, 0.001 – 0.2wt% S, 0.007 – 0.06wt% Fe, up to 0.01wt% Cl, and 1 – 10 wt% H₂O, and

wherein the silica product has a pH between 4 – 9.

48. (New-Withdrown) A silica product manufactured according to the process for the production of precipitated silica from olivine according to claim 28,

wherein the silica product comprises, in addition to silica (SiO₂); 0.005 – 0.7 wt% Na, 0.0035 – 0.35wt% Al, 0.02 – 0.05wt% Mg, 0.002 – 0.006wt% Ca, 0.001 – 0.2wt% S, 0.007 – 0.06wt% Fe, up to 0.01wt% Cl, and 1 – 10 wt% H₂O, and

wherein the silica product has a pH between 4 – 9.

49. (New-Withdrawn) A silica product manufactured according to the process for the production of precipitated silica from olivine according to claim 29,

wherein the silica product comprises, in addition to silica (SiO₂); 0.005 – 0.7 wt% Na, 0.0035 – 0.35wt% Al, 0.02– 0.05wt% Mg, 0.002– 0.006wt% Ca, 0.001– 0.2wt% S, 0.007– 0.06wt% Fe, up to 0.01wt% Cl, and 1 – 10 wt% H₂O, and

wherein the silica product has a pH between 4 – 9.